

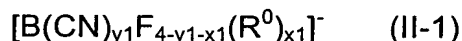
## Patent Claims

### 1. Cationic dyes of the general formula I



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where  $\text{Y}^-$  is an anion selected from the group  $\text{CAB}^-$ ,  $\text{FAP}^-$ ,  $\text{FAB}^-$  or  $\text{Im}^-$ ,  
where  $\text{CAB}^-$  conforms to the general formula (II-1)



and

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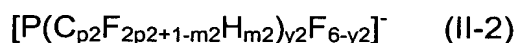
$y1$  denotes 1, 2, 3 or 4,

$x1$  denotes 0, 1, 2 or 3 and

$\text{R}^0$  denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or  
alkylaryl, with the condition that  $\text{R}^0$  may be hydrogen if  $y1$  is  $>2$ ,

where  $\text{FAP}^-$  conforms to the general formula (II-2)

15



with

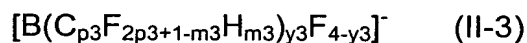
$p2$ : 1 to 20,

$m2$ : 0, 1, 2 or 3 and

20

$y2$ : 1, 2, 3 or 4,

where  $\text{FAB}^-$  conforms to the general formula (II-3)



with

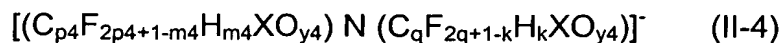
$p3$  1 to 20,

25

$m3$  0, 1, 2 or 3 and

$y3$  1, 2, 3 or 4,

where  $\text{Im}^-$  conforms to the general formula (II-4)



and the variables

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$\text{X}$  denotes carbon or sulfur,

$p4$  denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

$q$  denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y<sub>4</sub> denotes 1 or 2,

where m<sub>4</sub> = 0 if p<sub>4</sub> = 0 and k = 0 if q = 0,

with the proviso

5 if X is sulfur, y<sub>4</sub> denotes 2 and if X is carbon, y<sub>4</sub> denotes 1 and p<sub>4</sub> or  
q ≥ 1,

and where the carbon atoms of the alkyl chain of the formula II-4 may be  
bonded to one another by single bonds, where the resultant alkylene  
chain may in turn be partially or fully substituted by F,

10 and

CAT<sup>+</sup> is a cation selected from the group of the azine, xanthene, poly-  
methine, styryl, azo, tetrazolium, pyrylium, benzopyrylium, thiopyrylium,  
benzothiopyrylium, thiazine, oxazine, triarylmethane, diarylmethane,  
15 acridine, quinoline, isoquinoline or quaternised azafluorenone dyes,  
where 3,3'-diethoxyethyl-2,2'-thiadibocyanine trifluoromethyltrifluoro-  
borate is excluded.

2. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of an  
azine dye.

20

3. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a  
xanthene dye.

4. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a  
polymethine dye.

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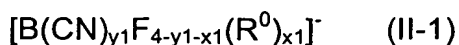
5. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a  
styryl dye.

6. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of an  
azo dye.

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7. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a tetrazolium dye.
- 5 8. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a pyrylium dye.
9. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a benzopyrylium dye.
- 10 10. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a thiopyrylium dye.
11. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a benzothiopyrylium dye.
- 15 12. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a thiazine dye.
13. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of an oxazine dye.
- 20 14. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a triarylmethane dye.
- 25 15. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a diarylmethane dye.
16. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of an acridine dye.
- 30 17. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a quinoline dye.

18. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of an isoquinoline dye.
- 5 19. Dyes according to Claim 1, characterised in that CAT<sup>+</sup> is a cation of a quaternary azafluorenone dye.
20. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a cyanine dye.
- 10 21. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a carbocyanine dye.
22. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of an azacarbocyanine dye.
- 15 23. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a diazacarbocyanine dye.
- 20 24. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a triazacarbocyanine dye.
- 25 25. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a hemicyanine dye.
26. Dyes according to Claim 4, characterised in that CAT<sup>+</sup> is a cation of a diazahemicyanine dye.
27. Dyes according to one or more of Claims 1 to 26, characterised in that Y<sup>-</sup> is a cyanoborate of the formula II-1
- 30



and

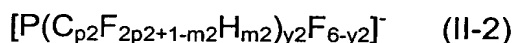
y<sub>1</sub> denotes 1, 2, 3 or 4,

x<sub>1</sub> denotes 0, 1, 2 or 3 and

R<sup>0</sup> denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that R<sup>0</sup> may be hydrogen if y<sub>1</sub> is >2.

5

28. Dyes according to one or more of Claims 1 to 26, characterised in that Y<sup>-</sup> is a fluoroalkylphosphate of the formula II-2



with

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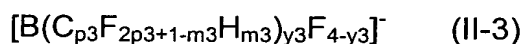
p<sub>2</sub>: 1 to 20,

m<sub>2</sub>: 0, 1, 2 or 3 and

y<sub>2</sub>: 1, 2, 3 or 4.

29. Dyes according to one or more of Claims 1 to 26, characterised in that Y<sup>-</sup> is a fluoroalkylborate of the formula II-3

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with

p<sub>3</sub> 1 to 20,

m<sub>3</sub> 0, 1, 2 or 3 and

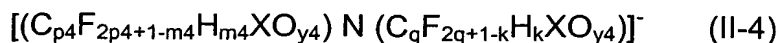
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y<sub>3</sub> 1, 2, 3 or 4,

where 3,3'-diethoxyethyl-2,2'-thiadiborocyanine trifluoromethyltrifluoroborate is excluded.

30. Dyes according to one or more of Claims 1 to 26, characterised in that Y<sup>-</sup> is an imide of the formula II-4

25



and the variables

X denotes carbon or sulfur,

p<sub>4</sub> denotes 0 to 20 and 0 ≤ m<sub>4</sub> ≤ 2p<sub>4</sub>+1,

30

q<sub>4</sub> denotes 0 to 20 and 0 ≤ k<sub>4</sub> ≤ 2q<sub>4</sub>+1,

y<sub>4</sub> denotes 1 or 2,

where  $m_4 = 0$  if  $p_4 = 0$  and  $k = 0$  if  $q = 0$ ,

with the proviso

if X is sulfur,  $y_4$  denotes 2 and if X is carbon,  $y_4$  denotes 1 and  $p_4$  or  $q \geq 1$ ,

5 and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F.

10 31. Process for the preparation of cationic dyes according to one of Claims 1 to 30, characterised in that

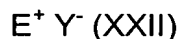
a compound of the general formula XXI



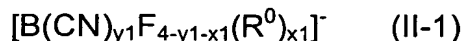
15 where  $\text{CAT}^+$  is a cation selected from the group of the azine, xanthene, polymethine, styryl, azo, tetrazolium, pyrylium, benzopyrylium, thiopyrylium, benzothiopyrylium, thiazine, oxazine, triarylmethane, diarylmethane, acridine, quinoline, isoquinoline or quaternised azafluorenone dyes

20 and  $\text{A}^-$  denotes  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{ClO}_4^-$ , sulfate, tosylate, hydro-sulfate, triflate, trifluoroacetate, acetate or oxalate,

is reacted with a compound of the general formula XXII



25 where  $\text{Y}^-$  is an anion selected from the group  $\text{CAB}^-$ ,  $\text{FAP}^-$ ,  $\text{FAB}^-$  or  $\text{Im}^-$ , where  $\text{CAB}^-$  conforms to the general formula (II-1)



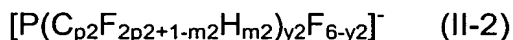
and

$y_1$  denotes 1, 2, 3 or 4,

$x_1$  denotes 0, 1, 2 or 3 and

30  $\text{R}^0$  denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that  $\text{R}^0$  may be hydrogen if  $y_1$  is  $>2$ ,

where  $\text{FAP}^-$  conforms to the general formula (II-2)



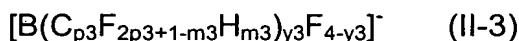
with

p2: 1 to 20,

m2: 0, 1, 2 or 3 and

y2: 1, 2, 3 or 4,

where FAB<sup>-</sup> conforms to the general formula (II-3)



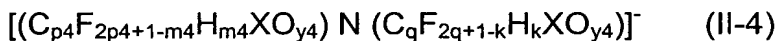
with

p3 1 to 20,

m3 0, 1, 2 or 3 and

y3 1, 2, 3 or 4,

where Im<sup>-</sup> conforms to the general formula (II-4)



and the variables

X denotes carbon or sulfur,

p4 denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y4 denotes 1 or 2,

where m4 = 0 if p4 = 0 and k = 0 if q = 0,

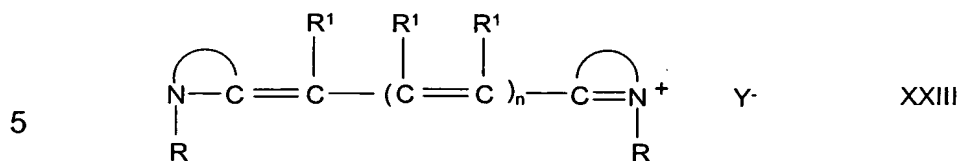
with the proviso

if X is sulfur, y4 denotes 2 and if X is carbon, y4 denotes 1 and p4 or q ≥ 1,

and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F, and

E<sup>+</sup> is a cation of the alkali metals, alkaline earth metals or of a metal from group 11 and 12, ammonium, alkylammonium containing C<sub>1</sub>-C<sub>4</sub>-alkyl, phosphonium, alkylphosphonium containing C<sub>1</sub>-C<sub>4</sub>-alkyl or guanidinium.

32. Process for the preparation of carbocyanine dyes according to Claim 21, where the carbocyanine dye conforms to the formula XXIII



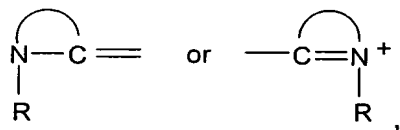
in which

n denotes 0, 1, 2, 3, 4 or 5,

R in each case, independently of one another, denotes alkyl, alkenyl, cycloalkyl, aryl or heteroaryl and

R<sup>1</sup> in each case, independently of one another, denotes H, Cl, Br, I, alkyl, partially or fully chlorinated alkyl, alkenyl, cycloalkyl, aryl, heteroaryl, Oalkyl, Oaryl, Salkyl, Saryl, NHalkyl, N(alkyl)<sub>2</sub>, C(O)H, C(O)alkyl, C(O)aryl, CN, N=N-aryl, P(aryl)<sub>2</sub>, NHC(O)alkyl or NHC(O)aryl and

the ring system, represented by

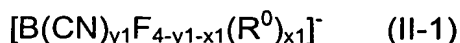


denotes a nitrogen-containing unsaturated mono-, bi- or tricyclic heterocycle having 5 to 13 ring members, which may furthermore contain 1, 2 or 3 N and/or 1 or 2 S or O atoms and in which the heterocyclic radical may be mono- or polysubstituted by Z,

Z denotes hydrogen, alkyl, NO<sub>2</sub>, F, Cl, Br, I, OH, COOH, Oalkyl, SCN, SCF<sub>3</sub>, COOalkyl, CH<sub>2</sub>-COOalkyl, NH<sub>2</sub>, NHalkyl or N(alkyl)<sub>2</sub>

and

where Y<sup>-</sup> is an anion selected from the group CAB<sup>-</sup>, FAP<sup>-</sup>, FAB<sup>-</sup> or Im<sup>-</sup>, where CAB<sup>-</sup> conforms to the general formula (II-1)



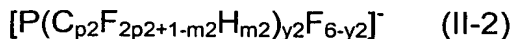
and

y1 denotes 1, 2, 3 or 4,

x1 denotes 0, 1, 2 or 3 and



$R^0$  denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that  $R^0$  may be hydrogen if  $y_1$  is  $>2$ , where  $FAP^-$  conforms to the general formula (II-2)



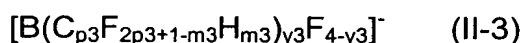
with

$p_2$ : 1 to 20,

$m_2$ : 0, 1, 2 or 3 and

$y_2$ : 1, 2, 3 or 4,

where  $FAB^-$  conforms to the general formula (II-3)



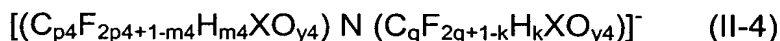
with

$p_3$  1 to 20,

$m_3$  0, 1, 2 or 3 and

$y_3$  1, 2, 3 or 4,

where  $Im^-$  conforms to the general formula (II-4)



and the variables

$X$  denotes carbon or sulfur,

$p_4$  denotes 0 to 20 and  $0 \leq m_4 \leq 2p_4+1$ ,

$q$  denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

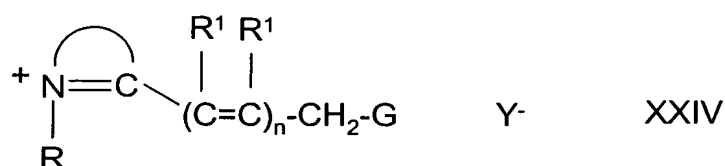
$y_4$  denotes 1 or 2,

where  $m_4 = 0$  if  $p_4 = 0$  and  $k = 0$  if  $q = 0$ ,

with the proviso

if  $X$  is sulfur,  $y_4$  denotes 2 and if  $X$  is carbon,  $y_4$  denotes 1 and  $p_4$  or  $q \geq 1$ ,

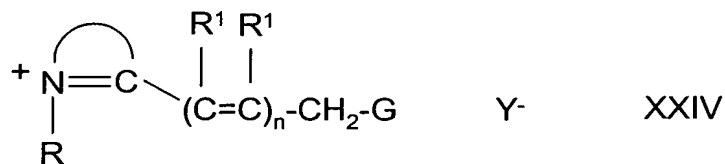
and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F, characterised in that use is made of a compound of the formula XXIV



5 where the ring system, R, R<sup>1</sup> and Y<sup>-</sup> have one of the meanings indicated in the case of formula XXIII and  
 n denotes 0, 1, 2, 3 or 4 and  
 G denotes hydrogen, alkyl, alkenyl, aryl, heteroaryl, N=C(R)<sub>2</sub>, CONH-aryl, C(O)aryl or CONHalkyl.

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33. Compounds of the formula XXIV



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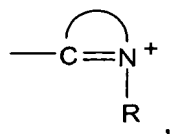
where

n denotes 0, 1, 2, 3 or 4,

20 G denotes hydrogen, alkyl, alkenyl, aryl, heteroaryl, N=C(R)<sub>2</sub>, CONH-aryl, C(O)aryl or CONHalkyl,

R denotes alkyl, alkenyl, cycloalkyl, aryl or heteroaryl,

25 R<sup>1</sup> in each case, independently of one another, denotes H, Cl, Br, I, alkyl, partially or fully chlorinated alkyl, alkenyl, cycloalkyl, aryl, heteroaryl, Oalkyl, Oaryl, Salkyl, Saryl, NHalkyl, N(alkyl)<sub>2</sub>, C(O)H, C(O)alkyl, C(O)aryl, CN, N=N-aryl, P(aryl)<sub>2</sub>, NHC(O)alkyl or NHC(O)aryl and the ring system, represented by



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denotes a nitrogen-containing unsaturated mono-, bi- or tricyclic heterocycle having 5 to 13 ring members, which may furthermore contain 1, 2

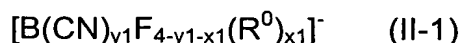
or 3 N and/or 1 or 2 S or O atoms and in which the heterocyclic radical may be mono- or polysubstituted by Z,

Z denotes hydrogen, alkyl, NO<sub>2</sub>, F, Cl, Br, I, OH, COOH, Oalkyl, SCN, SCF<sub>3</sub>, COOalkyl, CH<sub>2</sub>-COOalkyl, NH<sub>2</sub>, NHalkyl or N(alkyl)<sub>2</sub>

and

where Y<sup>-</sup> is an anion selected from the group CAB<sup>-</sup>, FAP<sup>-</sup>, FAB<sup>-</sup> or Im<sup>-</sup>,

where CAB<sup>-</sup> conforms to the general formula (II-1)



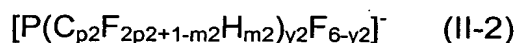
and

y1 denotes 1, 2, 3 or 4,

x1 denotes 0, 1, 2 or 3 and

R<sup>0</sup> denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that R<sup>0</sup> may be hydrogen if y1 is >2,

where FAP<sup>-</sup> conforms to the general formula (II-2)



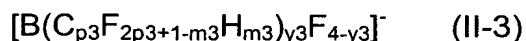
with

p2: 1 to 20,

m2: 0, 1, 2 or 3 and

y2: 1, 2, 3 or 4,

where FAB<sup>-</sup> conforms to the general formula (II-3)



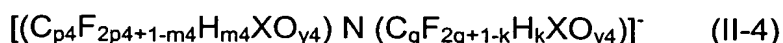
with

p3 1 to 20,

m3 0, 1, 2 or 3 and

y3 1, 2, 3 or 4,

where Im<sup>-</sup> conforms to the general formula (II-4)



and the variables

X denotes carbon or sulfur,

p4 denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y<sub>4</sub> denotes 1 or 2,

where m<sub>4</sub> = 0 if p<sub>4</sub> = 0 and k = 0 if q = 0,

with the proviso

5 if X is sulfur, y<sub>4</sub> denotes 2 and if X is carbon, y<sub>4</sub> denotes 1 and p<sub>4</sub> or q ≥ 1,

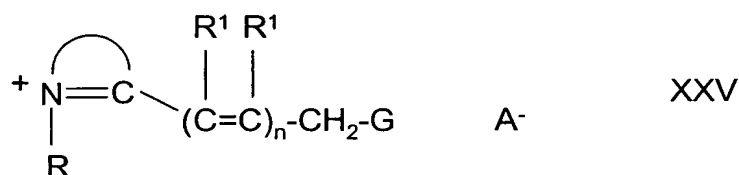
and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F.

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34. Process for the preparation of the compounds of the formula XXIV according to Claim 33,

characterised in that

15 a compound of the formula XXV



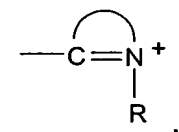
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in which

A<sup>-</sup> denotes Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, BF<sub>4</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, ClO<sub>4</sub><sup>-</sup>, sulfate, tosylate, hydrosulfate, tri-  
flate, trifluoroacetate, acetate or oxalate,

the ring system, represented by

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denotes a nitrogen-containing unsaturated mono-, bi- or tricyclic hetero-  
cycle having 5 to 13 ring members, which may furthermore contain 1, 2  
or 3 N and/or 1 or 2 S or O atoms and in which the heterocyclic radical  
may be mono- or polysubstituted by Z,

Z denotes hydrogen, alkyl, NO<sub>2</sub>, F, Cl, Br, I, OH, COOH, Oalkyl, SCN, SCF<sub>3</sub>, COOalkyl, CH<sub>2</sub>-COOalkyl, NH<sub>2</sub>, NHalkyl or N(alkyl)<sub>2</sub>,

n denotes 0, 1, 2, 3 or 4,

5 R denotes alkyl, alkenyl, cycloalkyl, aryl or heteroaryl,

R<sup>1</sup> in each case, independently of one another, denotes H, Cl, Br, I, alkyl, partially or fully chlorinated alkyl, alkenyl, cycloalkyl, aryl, heteroaryl, Oalkyl, Oaryl, Salkyl, Saryl, NHalkyl, N(alkyl)<sub>2</sub>, C(O)H, C(O)alkyl, C(O)aryl, CN, N=N-aryl, P(aryl)<sub>2</sub>, NHC(O)alkyl or NHC(O)aryl and

10 G denotes hydrogen, alkyl, alkenyl, aryl, heteroaryl, N=C(R)<sub>2</sub>, CONH-aryl, C(O)aryl or CONHalkyl,

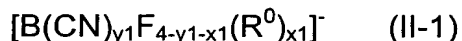
is reacted with a compound of the formula XXVI



15 in which

E<sup>+</sup> is a cation of the alkali metals, alkaline earth metals or of a metal from group 11 and 12, ammonium, alkylammonium containing C<sub>1</sub>-C<sub>4</sub>-alkyl, phosphonium, alkylphosphonium containing C<sub>1</sub>-C<sub>4</sub>-alkyl or guanidinium and

20 where Y<sup>-</sup> is an anion selected from the group CAB<sup>-</sup>, FAP<sup>-</sup>, FAB<sup>-</sup> or Im<sup>-</sup>, where CAB<sup>-</sup> conforms to the general formula (II-1)



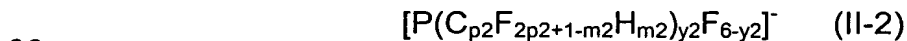
and

25 y1 denotes 1, 2, 3 or 4,

x1 denotes 0, 1, 2 or 3 and

R<sup>0</sup> denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that R<sup>0</sup> may be hydrogen if y1 is >2,

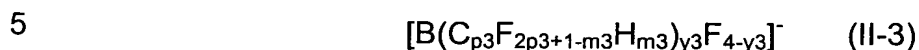
where FAP<sup>-</sup> conforms to the general formula (II-2)



with

p2: 1 to 20,  
m2: 0, 1, 2 or 3 and  
y2: 1, 2, 3 or 4,

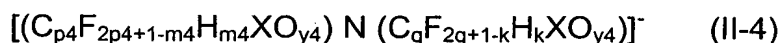
where FAB<sup>-</sup> conforms to the general formula (II-3)



with

p3 1 to 20,  
m3 0, 1, 2 or 3 and  
y3 1, 2, 3 or 4,

where Im<sup>-</sup> conforms to the general formula (II-4)



and the variables

X denotes carbon or sulfur,

p4 denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y4 denotes 1 or 2,

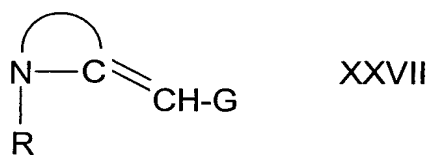
where  $m4 = 0$  if  $p4 = 0$  and  $k = 0$  if  $q = 0$ ,

with the proviso

if X is sulfur, y4 denotes 2 and if X is carbon, y4 denotes 1 and  $p4$  or  $q \geq 1$ ,

and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F.

35. Process for the preparation of compounds of the formula XXIV according to Claim 33, with the restriction that n in formula XXIV denotes 0, characterised in that  
a compound of the formula XXVII



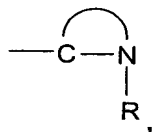
5 in which

G denotes hydrogen, alkyl, alkenyl, aryl, heteroaryl,  $N=C(R)_2$ ,  $CONH$ -aryl,  $C(O)$ aryl or  $CONH$ alkyl and

R denotes alkyl, alkenyl, cycloalkyl, aryl or heteroaryl

10 and

the ring system, represented by



15

denotes a nitrogen-containing unsaturated mono-, bi- or tricyclic hetero-cycle having 5 to 13 ring members, which may furthermore contain 1, 2 or 3 N and/or 1 or 2 S or O atoms and in which the heterocyclic radical may be mono- or polysubstituted by Z,

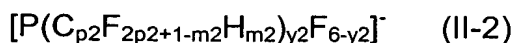
20 Z denotes hydrogen, alkyl,  $NO_2$ , F, Cl, Br, I, OH, COOH, Oalkyl, SCN,  $SCF_3$ , COOalkyl,  $CH_2$ -COOalkyl,  $NH_2$ , NHalkyl or  $N(alkyl)_2$ ,

is reacted with HY,

where  $Y^-$  is an anion selected from the group  $FAP^-$ ,  $FAB^-$  or  $Im^-$ ,

where  $FAP^-$  conforms to the general formula (II-2)

25



with

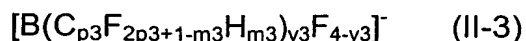
p2: 1 to 20,

m2: 0, 1, 2 or 3 and

30

y2: 1, 2, 3 or 4,

where  $FAB^-$  conforms to the general formula (II-3)



with

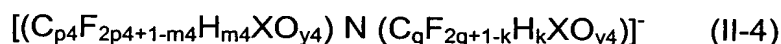
p3 1 to 20,

m3 0, 1, 2 or 3 and

y3 1, 2, 3 or 4,

5

where  $\text{Im}^-$  conforms to the general formula (II-4)



and the variables

X denotes carbon or sulfur,

p4 denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

10

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y4 denotes 1 or 2,

where  $m4 = 0$  if  $p4 = 0$  and  $k = 0$  if  $q = 0$ ,

with the proviso

15

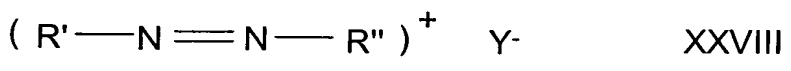
if X is sulfur, y4 denotes 2 and if X is carbon, y4 denotes 1 and p4 or

$q \geq 1$ ,

and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F.

20

36. Process for the preparation of azo dyes according to Claim 6, where the azo dye conforms to the formula XXVIII



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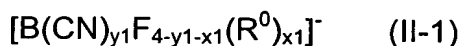
where

R' and R'' denote aryl or heteroaryl and one of the two aromatic nuclei is positively charged and

where Y<sup>-</sup> is an anion selected from the group CAB<sup>-</sup>, FAP<sup>-</sup>, FAB<sup>-</sup> or Im<sup>-</sup>,

where CAB<sup>-</sup> conforms to the general formula (II-1)

30



and

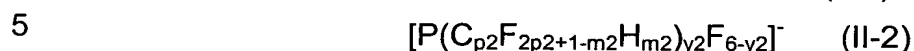
y1 denotes 1, 2, 3 or 4,



x1 denotes 0, 1, 2 or 3 and

R<sup>0</sup> denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or alkylaryl, with the condition that R<sup>0</sup> may be hydrogen if y1 is >2,

where FAP<sup>-</sup> conforms to the general formula (II-2)



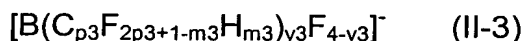
with

p2: 1 to 20,

m2: 0, 1, 2 or 3 and

10 y2: 1, 2, 3 or 4,

where FAB<sup>-</sup> conforms to the general formula (II-3)



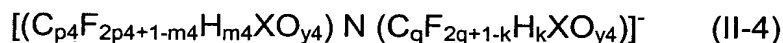
with

p3 1 to 20,

15 m3 0, 1, 2 or 3 and

y3 1, 2, 3 or 4,

where Im<sup>-</sup> conforms to the general formula (II-4)



and the variables

20 X denotes carbon or sulfur,

p4 denotes 0 to 20 and  $0 \leq m4 \leq 2p4+1$ ,

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y4 denotes 1 or 2,

where m4 = 0 if p4 = 0 and k = 0 if q = 0,

25 with the proviso

if X is sulfur, y4 denotes 2 and if X is carbon, y4 denotes 1 and p4 or q ≥ 1,

and where the carbon atoms of the alkyl chain of the formula II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F,

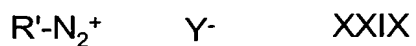
30 characterised in that a compound of the formula XXIX



where R' and Y<sup>-</sup> has one of the meaning indicated in the case of formula XXVIII,

5 is reacted with the aromatic cyclic or heterocyclic compound R".

### 37. Compounds of the formula XXIX



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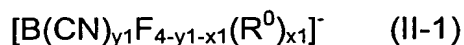
in which

R' denotes aryl or heteroaryl and

where Y<sup>-</sup> is an anion selected from the group CAB<sup>-</sup>, FAP<sup>-</sup>, FAB<sup>-</sup> or Im<sup>-</sup>,

where CAB<sup>-</sup> conforms to the general formula (II-1)

15



and

y1 denotes 1, 2, 3 or 4,

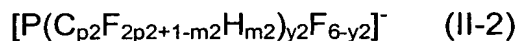
x1 denotes 0, 1, 2 or 3 and

R<sup>0</sup> denotes alkyl, aryl, fluorinated alkyl, fluorinated aryl, cycloalkyl or

20

alkylaryl, with the condition that R<sup>0</sup> may be hydrogen if y1 is >2,

where FAP<sup>-</sup> conforms to the general formula (II-2)



with

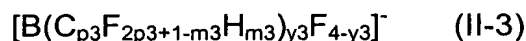
25

p2: 1 to 20,

m2: 0, 1, 2 or 3 and

y2: 1, 2, 3 or 4,

where FAB<sup>-</sup> conforms to the general formula (II-3)



30

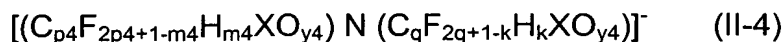
with

p3 1 to 20,

m3 0, 1, 2 or 3 and

y<sub>3</sub> 1, 2, 3 or 4,

where Im<sup>-</sup> conforms to the general formula (II-4)



and the variables

5

X denotes carbon or sulfur,

p<sub>4</sub> denotes 0 to 20 and  $0 \leq m_4 \leq 2p_4+1$ ,

q denotes 0 to 20 and  $0 \leq k \leq 2q+1$ ,

y<sub>4</sub> denotes 1 or 2,

where m<sub>4</sub> = 0 if p<sub>4</sub> = 0 and k = 0 if q = 0,

10

with the proviso

if X is sulfur, y<sub>4</sub> denotes 2 and if X is carbon, y<sub>4</sub> denotes 1 and p<sub>4</sub> or q ≥ 1,

and where the carbon atoms of the alkyl chain of the formulae II-4 may be bonded to one another by single bonds, where the resultant alkylene chain may in turn be partially or fully substituted by F.

15

38. Use of the dyes according to one of Claims 1 to 30 for colouring plastics and plastic fibres, for the preparation of flexographic printing inks, as ball-point pen pastes, as stamp ink, for colouring leather and paper, in cosmetic formulations in the paints industry, in biochemistry, biology, medicine, analytics or electronics.

20

39. Use of the dyes according to one of Claims 1 to 30 in data acquisition systems, reprography, in ink microfilters, in photogalvanics, laser technology or the photo industry.

25

40. Use of the dyes according to one of Claims 1 to 30 for CD recorders, DVD recorders (DVD+R, DVD+RW), Blu-ray disc (BD-ROM, BD-R, BD-RE), computer to plate, laser filters, laser marking or photopolymerisation.

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